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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/985,844	11/06/2001	Stefan Dobler	030650-074	4459

27045 7590 09/07/2004

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EXAMINER

ALBERTALLI, BRIAN LOUIS

ART UNIT PAPER NUMBER

2655

DATE MAILED: 09/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/985,844	Applicant(s) DOBLER ET AL.	
	Examiner Brian L. Albertalli	Art Unit 2655	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 November 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1/11/02, 7/22/02</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Drawings

1. The drawings are objected to because Fig. 1 lacks verbal labels for elements 110, 140, 150, and 160. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-3, 7-8, 10-14, and 18-19 are rejected under 35 U.S.C. 102(e) as being anticipated by Kuroda (U.S. Patent 6,732,074).

In regard to claim 1 and 12, Kuroda discloses a method and computer program product for generating adapted references for automatic speech recognition, comprising:

Performing recognition based on a spoken utterance and obtaining a recognition result which corresponds to a currently valid reference (Fig. 5, S14, matching unit (Fig.

1, 3) determines phoneme and path information stored in the standard dictionary 1 that corresponds to input speech, column 4, lines 36-67);

Adapting the currently valid reference (phoneme information in the standard dictionary) in accordance with the spoken utterance to generate an adapted reference (S20, phoneme information in standard dictionary 1 is replaced with features of the input phonemes, to create updated phoneme information, column 6, lines 45-47); and

Assessing the adapted reference (input phonemes used to create updated phoneme information) and deciding if the adapted reference is to be used for further recognition (S17, distance between features of the input phonemes and the corresponding phoneme information in the standard dictionary 1 are calculated to determine whether the phoneme information in the standard dictionary will be replaced by the input features for further recognition, column 6, lines 23-45).

In regard to claim 2, Kuroda discloses the adapted reference is assessed by determining a distance between the adapted reference (input phonemes used to create updated phoneme information) and the currently valid reference (phoneme information in the standard dictionary, column 6, lines 23-45).

In regard to claim 3 and 7, Kuroda discloses the adapted reference is assessed also based on a user behavior (S16, speaker confirms that the recognition result is correct, column 7, lines 11-20).

In regard to claim 8, Kuroda discloses substituting the currently valid reference (phoneme information in the standard dictionary) by the adapted reference (input phoneme features replace the phoneme information in standard dictionary 1 thereby creating updated phoneme information, column 6, lines 45-47)

In regard to claim 10, Kuroda discloses the adapted reference is created only when a user behavior indicates that the recognition result is correct (S16, updated phoneme information is only created when the speaker confirms the recognition result output is correct, column 7, lines 11-20).

In regard to claim 11, Kuroda discloses a method for generating adapted references to be used for automatic speech recognition, comprising:

Receiving a spoken utterance and matching a pattern of the spoken utterance with corresponding patterns of a plurality of currently valid references to obtain the currently valid reference which corresponds to the spoken utterance (Fig. 5, S14, matching unit (Fig. 1, 3) determines phoneme and path information stored in the standard dictionary 1 that corresponds to input speech, by comparing the input phonemes to a plurality of corresponding phonemes stored in the standard dictionary 1, column 4, lines 36-67 and column 5, lines 1-15);

Adapting the pattern of the currently valid reference (phoneme information in the standard dictionary) corresponding to the spoken utterance by shifting the pattern of the currently valid reference towards the pattern of the spoken utterance (input speech) to

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generate an adapted reference (Fig. 6, S20, vowel phoneme information in standard dictionary 1 is replaced with vowel features of the input phonemes, to create updated phoneme information, replacing the vowels shifts the pattern of the phoneme information in the standard dictionary 1 towards the input phonemes, column 6, lines 48-57);

Assessing the adapted reference by determining the distance between the adapted reference (input phonemes used to create updated phoneme information) and at least one of the currently valid references (S17, distance between features of the input phonemes and the corresponding phoneme information in the standard dictionary 1 are calculated, column 6, lines 23-45); and

Deciding on the basis of the one or more distances if the adapted reference is to be used for recognizing a subsequent spoken utterance (distance is calculated to determine whether the phoneme information in the standard dictionary will be replaced by the input features for further recognition column 6, lines 23-47).

In regard to claim 13, Kuroda discloses the computer program product with program code means is stored on a computer-readable recording medium (column 8, lines 5-8).

In regard to claim 14, Kuroda discloses a device for generating adapted references for automatic speech recognition, comprising:

A speech recognizer (matching unit 3) for performing recognition based on a spoken utterance and for obtaining a recognition result which corresponds to a currently valid reference (matching unit 3 compares input phonemes with phonemes in the standard dictionary 1, and outputs results to the result outputting unit 4, column 4, lines 36-67);

An adaption unit (dictionary updating unit 5) which adapts the currently valid reference in accordance with the spoken utterance to generate an adapted reference (column 5, lines 16-28);

And an assessing unit (matching unit 3) which assesses the adapted reference and which decides if the adapted reference is used for further recognition (matching unit 3 also calculates distance between the input phonemes used to create updated phoneme information and the phoneme information in the standard dictionary, column 5, lines 1-28).

In regard to claim 18, Koruda discloses a selection unit (matching unit 3) that determines all references currently valid for the recognition of spoken utterances (matching unit 3 finds the corresponding phonemes stored in recognition dictionary for recognition, column 5, lines 1-15).

Although Kuroda does not explicitly disclose a selection unit which sets pointers all references currently valid, Kuroda discloses the system is implemented in a personal computer (Fig. 7, includes CPU 21, ROM 22, and RAM 23, column 7, lines 41-53). Pointers are used to select memory location in a personal computer. Therefore, Kuroda

would inherently set a pointer to the memory location of the references that would be used for recognition.

In regard to claim 19, Koruda discloses device for generating adapted references for automatic speech recognition, comprising:

A speech recognizer (matching unit 3) which matches a pattern of a spoken utterance with patterns of a plurality of currently valid references to identify a currently valid reference which corresponds to the spoken utterance (matching unit 3 determines phoneme and path information stored in the standard dictionary 1 that corresponds to input speech, by comparing the input phonemes to a plurality of corresponding phonemes stored in the standard dictionary 1, column 4, lines 36-67 and column 5, lines 1-15;

An adaption unit (dictionary updating unit 5) which shifts the pattern of the currently valid reference (phoneme information in the standard dictionary) which corresponds to the spoken utterance towards the pattern of the spoken utterance (input speech) to generate an adapted reference (vowel phoneme information in standard dictionary 1 is replaced with vowel features of the input phonemes, to create updated phoneme information, replacing the vowels shifts the pattern of the phoneme information in the standard dictionary 1 towards the input phonemes, column 6, lines 48-57);

And an assessing unit which assesses the adapted reference (input phonemes used to create updated phoneme information) and which decides if the adapted

reference is to be used by the speech recognizer for recognizing a subsequent spoken utterance (distance between features of the input phonemes and the corresponding phoneme information in the standard dictionary 1 are calculated to determine whether the phoneme information in the standard dictionary will be replaced by the input features for further recognition, column 6, lines 23-45).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuroda, in view of Homma et al. (*Iterative Unsupervised Speaker Adaptation for Batch Dictation*).

Kuroda does not disclose further determining distances between the adapted reference and currently valid references which do not correspond to the recognition result.

Homma et al. discloses a method that calculates the distances (differences) between an adapted reference (generated in step 2 of the algorithm in the second column of page 1), and currently valid references which do not correspond to the recognition result (page 3, section 3.1, a recognition result is rejected if the difference between the first and second candidates is not the largest).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Kuroda to further determine distances between the adapted references and references which did not correspond to the recognition result in order to eliminate erroneous recognition results from the adaptive training, which improves the performance of the recognizer, as taught by Homma et al. (page 3, section 3.1, lines 1-3 and page 4, section 4, lines 11-13).

6. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuroda, in view of Li et al. (U.S. Patent 4,720,863).

In regard to claim 5, Kuroda discloses a threshold is used for deciding if the adapted reference is used for further recognition (column 6, lines 23-45).

Kuroda is silent as to how the threshold is determined.

Li et al. discloses a method that uses a histogram of previously determined distances (histograms of distances between speaker models are saved) to use as a parameter (distance D is used as a threshold) for deciding a recognition result (histograms for each speaker model are compared to unknown speech to recognize the unknown speech, column 5, line 3 through column 6, line 4).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Kuroda to analyze a histogram of previously determined distances to obtain a parameter (threshold) for determining if the adapted reference should be used for further recognition, since generating speaker models that include a parameter of

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previously determined distances provides high recognition accuracy (approximately 96%), as taught by Li et al. (column 6, lines 15-22).

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuroda.

Kuroda discloses that a distance is determined, but does not disclose the method used to determine the distance.

Official notice is taken that is notoriously well known and recognized in the art to use dynamic programming to determine the distance between speech patterns.

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Kuroda so the distance was determined by dynamic programming since, as is well known in the art, dynamic programming provides a simple, fast, efficient means to align two patterns and determine an accurate distance between the two patterns.

7. Claims 9 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuroda in view of Junqua (U.S. Patent 6,253,181).

In regard to claim 9, Kuroda does not disclose storing the adapted reference in addition to the currently valid reference (the adapted reference replaces the currently valid reference).

Junqua discloses a method that stores an adapted reference (adapted speech model) in addition to the currently valid reference (adapted speech model is stored apart from initial speech model column 3, lines 24-25).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Kuroda to store the adapted reference in addition to the currently valid reference, so the valid reference would remain intact for subsequent use by different new speakers, as taught by Junqua (column 3, lines 25-26).

In regard to claim 15, Kuroda discloses a first memory for storing a set of references (standard dictionary 1, column 3, line 65 through column 4, line 1).

Kuroda does not disclose a second memory for storing a second set of references.

Junqua discloses a first memory (Fig. 1, initial speech model 16) for storing a first set of references (models) and a second memory (adapted speech model 20) for storing a second set of references (models, column 3, lines 15-17 and lines 21-24).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Kuroda to include a first memory and a second memory for storing a first and second set of references, respectively, in order to store the adapted reference in addition to the currently valid reference, so the valid reference would remain intact for subsequent use by different new speakers, as taught by Junqua (column 3, lines 25-26).

In regard to claim 16, Kuroda does not disclose a selection unit which sets a pointer to either the first or the second memory depending on whether the first or the second set of references are to be used for recognition.

Junqua discloses a selection unit (speech recognizer 14) which selects either the first or the second memory depending on whether the first or the second set of references are to be used for recognition (speech recognizer 14 is associated with initial speech model 16 and adapted speech model 20, therefore speech recognizer 14 must select which model will be used for recognition, see Fig. 1, column 3, lines 13-18 and lines 21-24).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Kuroda to include a selection unit to select a first or second memory depending on which memory would be used for recognition, since a system with two memories for storing references would necessarily require some type of selection unit to make a decision as to which memory would be used for recognition.

Furthermore, although neither Kuroda nor Junqua disclose a selection unit which sets a pointer to either memory unit, Kuroda discloses the system is implemented in a personal computer (Fig. 7, includes CPU 21, ROM 22, and RAM 23, column 7, lines 41-53). Pointers are used to select memory location in a personal computer. Therefore, the combination of Kuroda and Junqua would necessarily set a pointer to the memory location of the references that would be used for recognition.

In regard to claim 17, Kuroda does not disclose a third memory for storing a set of mother references.

Junqua discloses a third memory (data store 24) for storing a set of mother references (data store 24 stores models for a plurality of training speakers that are used to constrain the adapted speech model 20, column 3, lines 32-47).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Kuroda to include a third memory for storing a set of mother references since the creation of mother references (constructing the eigenspace) is computationally expensive and a third memory for storing the mother references allows the computation to be carried out offline, as taught by Junqua (column 7, lines 17-22).

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ittycheriah et al. (U.S. Patent 5,895,447) discloses a speech recognition system that uses a threshold to determine whether to adapt a speech model. Shinoda (U.S. Patent 5,274,737) discloses a system that calculates the similarity between stored patterns before the adaptation of a stored pattern. Sejnoha (U.S. Patent 6,260,013) discloses a system that corrects an adaptation if the user indicates the recognition result was incorrect. Suzuki et al. (U.S. Patent 4,060,694) discloses a system that adapts a reference pattern by selecting the stored pattern that is closest to the input pattern. Larkey (U.S. Patent 5,127,055) discloses a system that keeps a score for each stored reference and adapts the reference only when that score drops below a certain threshold.

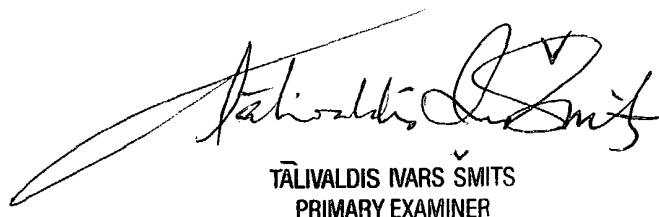
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian L. Albertalli whose telephone number is (703) 305-1817. The examiner can normally be reached on Monday - Friday, 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Talivaldis Smits can be reached on (703) 305-3011. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BLA 8/26/04



TĀLIVALDIS NARS ŠMITS
PRIMARY EXAMINER